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IN THE
COURT OF APPEALS OF INDIANA

FORD MOTOR COMPANY and TRW VEHICLE SAFETY SYSTEMS, INC.,	)	
Appellants-Defendants,	)	
vs.	)	No. 73A05-0710-CV-552
SALLY MOORE, Personal Representative of the Estate of Daniel A. Moore,	)	
Appellee-Plaintiff.	)	

APPEAL FROM THE SHELBY CIRCUIT COURT
The Honorable Charles D. O'Connor, Judge
Cause No. 73C01-0305-CT-13

March 13, 2009

MEMORANDUM DECISION - NOT FOR PUBLICATION

BAILEY, Judge

Case Summary

Ford Motor Co. ("Ford") & TRW Vehicle Safety Systems, Inc. ("TRW") appeal following the denial of their Motion to Correct Error, which challenged a jury verdict in favor of Sally Moore, as the Personal Representative of the Estate of Daniel A. Moore ("the Estate"), upon the Estate's product negligence claim. We reverse.

Issue

Ford and TRW challenge the sufficiency of the evidence, the evidentiary rulings of the trial court, and the denial of Ford's request for a mistrial. We find dispositive a single issue: whether the Estate presented sufficient evidence to establish its product negligence claim.

Facts and Procedural History

On December 20, 2001, Daniel Moore, the operator and sole occupant of a 1997 Ford XLT Explorer manufactured by Ford, was traveling southbound on I-65 in Shelby County, Indiana when his left front tire tread separated. The Explorer left the traveled portion of the roadway, continued up a sloped wall under a bridge overpass, hit a curb with the right front wheel at fifty miles per hour, launched approximately ten feet into the air, continued forward

for approximately sixty feet, landed, and rolled several times. Moore was wearing a properly fastened seatbelt that had been manufactured for Ford by TRW. Nevertheless, Moore was ejected from the vehicle through the sunroof, which had been closed and latched prior to the crash. Moore died at the scene of the accident.

The Estate brought a lawsuit against Ford, TRW, The Goodyear Tire and Rubber Company, and Renner Motors, Inc. Claims against the latter two defendants were settled. On February 22, 2007, the trial of the Estate's claims against TRW and Ford commenced.

Initially, the Estate alleged that the Ford Explorer was negligently designed in several respects. Allegedly, the vehicle had handling and stability defects causing loss of control and rollover, the sunroof brackets were of insufficient strength, allowing a separation and portal of ejection, and the seatbelt assembly allowed excessive spool-out of the webbing material resulting in slackness and failure of restraint. During the trial, the Estate also advanced the theory that the seatbelt slider bar was of inadequate strength. However, the jury was instructed not to consider any evidence of this alleged defect. The trial court also issued a ruling to the effect that a laminated glass defect argument implicitly introduced was "out of the case." (Tr. 883.)

Ford and TRW contended that Daniel's injuries resulted from the unusually severe nature of the crash and not from a defective product. Moreover, Ford and TRW alleged that the seatbelt assembly and sunroof design complied with applicable governmental regulations and were state-of-the-art designs. At the conclusion of the trial, the jury was instructed that it could return a verdict against Ford and for the Estate if it had proven that Ford placed into the

stream of commerce a defectively designed, unreasonably dangerous product and was negligent in the design of the product, with that product being either the seatbelt assembly or the sunroof. The jury was instructed that it could return a verdict against TRW and for the Estate if it had proven that TRW placed into the stream of commerce a defectively designed, unreasonably dangerous product and was negligent in the design of the product, with that product being the seatbelt assembly.

The jury determined that damages were $25,000,000 and apportioned fault as follows: Daniel Moore – 33%, TRW – 5%, Ford – 31%, and (Non-party) Goodyear – 31%. Accordingly, the verdict against TRW was $1,250,000 and the verdict against Ford was $7,750,000.

Discussion and Decision

Standard of Review

When, as here, the jury has returned a general verdict and the appellant argues that the evidence is not sufficient to support it but does not challenge the jury instructions, the general verdict will be sustained if the evidence is sufficient to sustain any theory of liability. Estate of Dyer v. Doyle, 870 N.E.2d 573, 584 (Ind. Ct. App. 2007), trans. denied. In this case, the jury was instructed upon a products liability claim based upon an alleged design defect, which constitutes a negligence theory. The jury was further instructed that the alleged design defect was either the seatbelt assembly or the sunroof.

Burden of Proof for Estate's Negligence Claim

Indiana Code Section 34-20-2-1 provides:

> Except as provided in section 3 of this chapter, a person who sells, leases, or otherwise puts into the stream of commerce any product in a defective condition unreasonably dangerous to any user or consumer or to the user's or consumer's property is subject to liability for physical harm caused by that product to the user or consumer or to the user's or consumer's property if:
> (1) that user or consumer is in the class of persons that the seller should reasonably foresee as being subject to the harm caused by the defective condition;
> (2) the seller is engaged in the business of selling the product; and
> (3) the product is expected to and does reach the user or consumer without substantial alteration in the condition in which the product is sold by the person sought to be held liable under this article.
>
> Indiana Code Section 34-20-2-2 provides:
>
> The rule stated in section 1 of this chapter applies although:
> (1) The seller has exercised all reasonable care in the manufacture and preparation of the product; and
> (2) The user or consumer has not bought the product from or entered into any contractual relation with the seller.
> However, in an action based on an alleged design defect in the product or based on an alleged failure to provide adequate warnings or instructions regarding the use of the product, the party making the claim must establish that the manufacturer or seller failed to exercise reasonable care under the circumstances in designing the product or in providing the warnings or instructions.

(emphasis added).

Indiana's Product Liability Act, partially quoted above, imposes liability upon sellers of a product in a defective condition unreasonably dangerous to any user or consumer. Ford Motor Co. v. Rushford, 868 N.E.2d 806, 809 (Ind. 2007). The Act governs actions brought by a user or consumer against a manufacturer or seller for physical harm caused by a product, regardless of the substantive legal theory or theories upon which the action is brought. Id.; Ind. Code § 34-20-1-1. The Estate alleged design defects and thus proceeded under a

negligence theory. See Ind. Code § 34-20-2-2.

To prevail on a negligence claim, the plaintiff must prove: (1) a duty owed by the defendant to the plaintiff; (2) a breach of that duty by the defendant; and (3) an injury to the plaintiff proximately caused by the breach. Ford, 868 N.E.2d at 810. The parties agree that Ford and TRW had a duty of care with regard to Moore as a consumer; they contest whether there was a breach of that duty and consequent injury. "[I]n an action based on an alleged design defect in the product …, the party making the claim must establish that the manufacturer or seller failed to exercise reasonable care under the circumstances in designing the product[.]" Ind. Code § 34-20-2-2.

Here, the precipitating event was the tire failure. Nonetheless, under the "doctrine of crashworthiness," a motor vehicle manufacturer may be liable for injuries sustained in a motor vehicle accident where a manufacturing or design defect, though not the cause of the accident, caused or enhanced the injuries. Miller v. Todd, 551 N.E.2d 1139, 1140 (Ind. 1990). In effect, the doctrine expands the proximate cause requirements to include enhanced injuries. Barnard v. Saturn Corp., 790 N.E.2d 1023, 1032 (Ind. Ct. App. 2003), trans. denied. The plaintiff in a crashworthiness case has the burden of proving that the manufacturer breached its duty in a manner that proximately caused injury to the plaintiff. Miller, 551 N.E.2d at 1141. "Defectiveness" from a crashworthiness standpoint is not merely the conclusion that a product failed and caused injury, but that the product failed to provide the consumer with reasonable protection under the circumstances surrounding a particular accident. Id. at 1143. "A claimant should be able to demonstrate that a feasible, safer, more

practicable product design would have afforded better protection." Id.[1]

The Miller standard was restated succinctly in Pries v. Honda Motor Co., Ltd., 31 F.3d 543, 546 (7th Cir. 1994):

> Indiana requires the plaintiff to show that another design not only could have prevented the injury but also was cost-effective under general negligence principles. Rosenbluth testified that particular additional devices would have kept the belt tight in a rollover, but he conceded that no car in production anywhere in the world in 1988 used the combination of devices he favored. This, coupled with the absence of data about either the costs of additional precautions or the aggregate injuries avoidable by using them, raises a serious question whether failure to adopt such a combination was negligent.

In accordance with this body of law, the jury here was instructed:

> In order for the plaintiff to recover against the defendants on a crash worthiness theory, plaintiffs must prove the following by a preponderance of the evidence:
>
> First, the plaintiff must prove that the manufacturer placed into the stream of commerce a defectively designed, unreasonably dangerous product and was negligent in the design of the product. With regard to TRW, the product at issue is the seatbelt assembly. With regard to Ford, the product at issue is the Explorer, and specifically the sunroof and the seatbelt assembly. This burden of proof may be met by showing the design alleged to have enhanced or increased the severity of plaintiff's injuries created an unreasonable danger or risk. The unreasonable danger or risk can be determined by balancing the likelihood of harm or injury, and the gravity of such injury, against the burden or precautions that would be effective to avoid the injury or harm.
>
> Second, the plaintiff must prove that a feasibly safer alternative product

[1] We have acknowledged, and now reiterate, that Moore's seatbelt and vehicular structure did not restrain him throughout the collision. That said, this is not an action in strict liability and Ford and TRW were not required to ensure Moore's safety. Rather, they were required to exercise reasonable care. The Estate elected to allege a design defect, and our Legislature has chosen to narrow relief available from a manufacturer in such cases in a somewhat draconian fashion. Pursuant to Indiana Code Section 34-20-2-2, the Estate was required to establish a negligence claim. The jury was instructed that the alleged negligent design was either the seatbelt assembly or the sunroof. With regard to the seatbelt assembly, the jury's focus was directed to the assembly and not an individual component. Likewise, our focus is not upon an individual component but upon the entire assembly. The Estate was required to compare the assembly to what else was available when the Ford Explorer was manufactured and placed in the stream of commerce.

> design existed, that would have afforded the occupant better protection, and would have resulted in lesser injury.
>
> Third, the plaintiff must prove that the defectively designed product proximately caused, or enhanced, the injuries that resulted. The plaintiff can fulfill this third element by establishing that the defectively designed product was a substantial factor in producing damages over and above those which were probably caused as a result of the initial impact or collision. . . .
>
> In order for plaintiff to recover on her claim that the Ford Explorer was defectively designed, she is required to establish by a preponderance of the evidence that, at the time she purchased the Ford Explorer, there existed a feasible, safer, more practicable alternative vehicle design that would have prevented Mr. Moore's death in this accident. Plaintiff must also prove that the safety benefits of her alternative designs were foreseeably greater than all of the costs of the alternative designs. It is not sufficient that the alternative design would have been safer in this particular accident unless plaintiff also proves that the alternative designs would have reduced the aggregate injuries from all accident[s].

(Tr. 2932-33, 2935.)

The jury was also instructed on the rebuttable presumption of Indiana Code Section 34-20-5-1 ("In a product liability action, there is a rebuttable presumption that the product that caused the physical harm was not defective and that the manufacturer or seller of the product was not negligent if, before the sale by the manufacturer, the product (1) was in conformity with the generally recognized state of the art applicable to the safety of the product at the time the product was designed, manufactured, packaged, and labeled; or (2) complied with applicable codes, standards, regulations, or specifications established, adopted, promulgated, or approved by the United States or by Indiana, or by an agency of the United States or Indiana.").[2] The jury was further instructed that the meeting of industry

[2] This presumption is properly given a continuing effect even though contrary evidence is received. Ind. Evidence Rule 301; Schultz v. Ford Motor Co., 857 N.E.2d 977, 982 (Ind. 2006).

standards is not conclusive proof that the product was reasonably safe, and that industry standards can be unreasonable.[3] Here, Ford and TRW presented evidence that the seatbelt assembly, including the emergency locking retractor, conformed to the applicable governmental standards and were state of the art. The Estate did not dispute this, but pointed to a lack of governmental standards that were "rollover specific."[4]

Expert Testimony to Support Claim

Bearing in mind that the Estate was required to show a proposed alternative design that would have prevented Moore's death in particular and also would have cost-effectively improved aggregate safety in general, we turn to our examination of the evidence presented. For the most part, the parties concentrated upon the seatbelt assembly.

Despite all indications that Moore's seatbelt was properly latched, Moore escaped its confines. The Estate advanced the theory that the seatbelt webbing "spooled out" and allowed ejection through an inadequately bolted sunroof. Ford and TRW's explanation of restraint failure was that the accident forces were so severe that the slider bar attached to the

[3] The National Traffic and Motor Vehicle Safety Act provides that "compliance with a motor vehicle safety standard … does not exempt a person from liability at common law." 49 U.S.C. § 30103(e) (2000). Recently, a panel of this Court has observed that this "savings clause" does not bar the ordinary working of conflict pre-emption principles. Roland v. General Motors Corp., 881 N.E.2d 722, 726 (Ind. Ct. App. 2008), trans. denied. The claimants in Roland had asserted that the restraint system of their vehicle was defectively and negligently designed because the center rear seat was equipped with a manual adjusting device, rather than a retractor. See id. at 729. This Court rejected the argument that FMVSS 208 provided only minimal safety standards, and held "that the Rolands' common law tort action is pre-empted on the narrow grounds that it conflicts with the deliberate and comprehensive regulatory scheme set forth in FMVSS 208." Id.

[4] Ford has contended, and the Estate's expert acknowledged, that the retractor system complied with pertinent Federal Motor Vehicle Safety Standards promulgated by the national Highway Traffic Safety Administration. There was evidence of specific standards for frontal collisions, which the seatbelt assembly met and exceeded. See FMVSS 208, 209, 210. Standards specific to "rollovers" had not been promulgated.

seatbelt assembly became severely deformed, allowed the buckle to move, and permitted Moore to slip out of the seatbelt.

The parties hotly contested whether the seatbelt webbing marks on the seatbelt from the Moore vehicle evidenced "spool-out" or normal wear on a vehicle with miles. TRW and Ford also argued that it is scientifically impossible for crash forces to cause the occupant to move but not affect the sensor ball in the retractor to induce emergency lock-up. Nevertheless, even assuming that "spool-out" occurred, the fact of product failure does not necessarily show "defect." See Miller, 551 N.E.2d at 1143. The question is not whether it is "possible" for something untoward to occur during an accident but whether "the design creates unreasonable danger" according to "general negligence principles." Pries, 31 F.3d at 545 (citing Miller, 551 N.E.2d at 1141). Thus, the crucial inquiry here is whether Ford and TRW were negligent because they failed to put forth a product of superior safety design and practicality.

Expert testimony is generally required to establish a design defect. Pries, 31 F.3d at 546. Indiana Evidence Rule 702 provides:

> (a) If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.
>
> (b) Expert scientific testimony is admissible only if the court is satisfied that the scientific principles upon which the expert testimony rests are reliable.

Evidence Rule 702 assigns to the trial court a "gatekeeping function" of ensuring that an expert's testimony rests upon a reliable foundation and is relevant. Lytle v. Ford Motor Co.,

814 N.E.2d 301, 309 (Ind. Ct. App. 2004), trans. denied. When the expert's testimony is based upon scientific principles, the proponent of the testimony must establish that the scientific principles upon which the testimony rests are reliable. Id. The trial court may consider such factors as whether a theory can be empirically tested, whether it has been subjected to peer review and publication, and whether there exists widespread acceptance. Id. Nevertheless, while such factors are useful, there is no specific "test" required to satisfy the requirements of Evidence Rule 702(b). See id.

Once the expert has been permitted to testify, the establishment of a "defect" in a crashworthiness case requires more than opinion testimony. Opinions must be supported by reliable data, such as testing, studies, or statistics to show the feasibility of alternative design proposals. In Bammerlin v. Navistar Int'l Trans. Corp., 30 F.3d 898 (7th Cir. 1994), a plaintiff claimed that a seatbelt design was defective after the driver was ejected during a tractor-trailer crash. Plaintiff's proposed alternate design was to anchor the seat belt to the cab floor as opposed to the engine housing. In reversing the jury verdict and remanding, the Court stated:

> That a product failed in a particular accident does not necessarily show "defect," however. Placing the anchorage in the engine housing increased the risks in a particular type of crash (one in which the cab disintegrates) but may reduce the risk in other kinds of crashes. The best evidence of net effects would be a study of seat belt failures in trucks designed with the cab over the engine (the kind involved here). Some anchor the seat belt in the cab floor, some in the engine housing. Does the latter fail more frequently than the former? Is the difference statistically significant? If an anchorage in the engine housing is indeed defective, then the answer to both questions should be "yes." Surprisingly, none of the expert witnesses in the case provided these data. Both the lawyers and the experts seemed to think that "defect" is a question of first principles, to be resolved by jurors as if they were engineers

> designing the first truck in the world rather than observers asking whether the design of a particular truck unduly increased the risk of injury. Jurors are not engineers, and data on accident rates speak more loudly than abstract arguments.

Id. at 901. The necessity of empirical evidence or statistical data was discussed in Rogers v. Ford Motor Co., 952 F.Supp. 606 (N.D. Ind. 1997). The Court acknowledged that hands-on testing is not an absolute prerequisite to the admission of expert testimony; nevertheless, the objective of ensuring intellectual rigor can be accomplished in several ways, including the review of experimental, statistical, or scientific data generated by those in the field. Id. at 615. The Court further explained:

> Even if it were infeasible, for example, for Myers personally to conduct the crash testing of representative vehicles, he nonetheless could have relied on statistical evidence to show that the nature and number of injuries associated with the proposed alternative seat belt design differ from those associated with the allegedly defective design. This he has not done.

Id. at 614-15. See also Lytle, 814 N.E.2d at 309 (finding exclusion of expert testimony proper where there existed "a significant analytical gap" between the expert's data and his conclusions); Whitted v. Gen. Motors Corp., 58 F.3d 1200, 1206 (7th Cir. 1995) (recognizing that "allowing a plaintiff to establish the existence of a design defect by his mere assertion is ludicrous" and re-iterating that the appropriate evidence for demonstrating that a particular alternative seat belt design could have prevented an injury would be a study of failures for that design).

We conclude from our review of Bammerlin, Rogers, Lytle, and Whitted, that the plaintiff in a negligent design/crashworthiness case must go beyond criticism of a defendant's design and proof of product failure. The plaintiff must proffer a demonstrably

better design that is feasible to implement in order to show that the defendant was negligent in selecting and implementing a design deemed to be inferior.

Design of Seatbelt Assembly

The Estate's principal expert witness was mechanical engineer Steven Meyer ("Meyer"), who stated that he had studied "automotive accidents and safety systems … going on 20 years." (Tr. 577.) Meyer's examination of the Moore vehicle seatbelt assembly led him to hypothesize that the 1997 Explorer had "a defective restraint system" because "it allows the belt to become unlocked during the rollover portion of a rollover." (Tr. 579.) However, because the claim proceeded in negligence and not in strict liability, the Estate was required to provide proof of an alternative design. Meyer testified that he had never designed a particular seatbelt, but he proposed that a seatbelt assembly should include two features not selected by Ford for Moore's Explorer, a cinching latch plate and a pretensioner. Meyer opined that these features were necessary because of the propensity of light trucks for rollover.

As the dissent points out, the Estate needed to "proffer a demonstrably better design in order to show that the defendant was negligent in selecting and implementing an inferior design." Dissent, slip op. at 3 (emphasis added). In other words, we ask how the alleged improved design performs in testing as compared with the subject design.

The subject for comparison to Meyer's proposed seatbelt assembly was Ford's seatbelt assembly. One feature of Ford's seatbelt assembly was the cup-and-ball retractor produced for Ford by TRW. The seatbelt assembly also featured a pass-through tongue or non-

cinching latch plate, a webbing sensor (to lock if webbing pulled out too quickly), and a web grabber. The retractor ball is a "crash sensor that responds to inertia" triggered by movement of one-tenth of one inch. (Tr. 1288.) The retractor was designed to lock upon (1) tilt in any direction of 26 or 27 degrees, (2) acceleration or deceleration, or (3) when belt webbing was pulled out rapidly. The ball and cup retractor had been in long-term use and was used in the majority of vehicles produced in 1996 (the year that Moore's 1997 vehicle was produced). It was still widely used as of the 2007 trial.

Meyer explained that when four conditions are met an intermittent release of seatbelt webbing can occur. The four conditions are (1) sensor in a ball & cup retractor design is in neutral and the ball is at the bottom of the cup; (2) tension is relieved; (3) the belt rewinds to allow the lock bar to fall out; and (4) tension is reapplied to extract significant belt. Meyer could not produce his own testing that replicated the actual conditions of the Moore accident. He could not determine at what point in the sequence of the accident the release of Moore's belt webbing would have occurred.

Compilations of Meyer's laboratory testing were excluded because of dissimilarity to the Moore accident conditions; however, Meyer was allowed to testify that he had conducted tests and produced webbing slack of 11 inches to 12.7 inches "with a vertically biased acceleration greater than .7 G's in a period of time of about 200 milliseconds." (Tr. 1653-54).[5] His vertical acceleration test did not include tension on the seatbelt. (Tr. 1659.) Thus,

[5] Meyer had compiled a video and reports from two experiments (including those from a rotating "spit" test and a vertical acceleration test) but they were excluded because the conditions were not substantially similar to the facts of the case.

it did not approximate the condition of a driver exerting tension on a seatbelt. Meyer acknowledged that numerous rollover crash tests using dummies of various weights had been conducted for the United States government and for automobile manufacturers using ball and cup retractors and pass-through tongues and conceded that, to his knowledge, not a single complete ejection had occurred.

Meyer described a cinching latch plate (as is used in airplanes) and opined there is "no good reason not to use it" as opposed to a pass-through tongue. (Tr. 1391.) Meyer believed if it had been used in this particular accident, Moore would have been retained inside his vehicle. However, the improvement of aggregate safety from the use of cinching latch plates was not established. They had been in common use in some older seat belt assemblies, but were less comfortable to passengers because of their heavier weight and springs. Their effectiveness was dependent upon proper tightening of the belt by the user. The devices were not able to balance the loads between the lap and torso portions of the seatbelt webbing. Meyer could not identify a 1997 vehicle with the cinching latch plate although he was aware that the 1992 Chevrolet Lumina featured one.

Meyer also opined that a pretensioner should have been used, and "had there been one, it would have gone off at the same time as the airbag before the rollover, and the tension would have maintained the belt in a locked condition." (Tr. 1533.) A pretensioner is a device designed to "fire one time" to eliminate small amounts of slack during an early phase of a collision, when an airbag sensor senses that a crash is imminent, and before the airbag deploys. (Tr. 2637.) Pretensioners of the mid-1990's could exert up to 50 pounds of

pressure in a collision and remove three inches of slack.[6] Pretensioners are based upon the premise that, if the pretensioner fires early in the event before greater opposing forces load the belt, and so long as the tension is maintained on the belt during an accident sequence, the belt will stay locked. Meyer testified that he did not calculate the amount of force Moore would have put on the seatbelt at the time the pretensioner would have been expected to fire, although he did not dispute the factual assertions that Moore weighed approximately 248 pounds and his vehicle dropped ten feet and rolled several times after initial contact with the bridge abutment.

Meyer's suggestion as to the use of a pretensioner is consistent, in part, with a written product development proposal TRW had made to Ford in April of 1996 expressing TRW's desire to "lead the market initiative toward pretensioners [and] integrated seat belts into the seat" and urging that "Ford and TRW should develop for the UW152 [2001½ model year Explorer]" those features. (Pl. Ex. 199, Appellee's Appendix pg. 19.) The Estate submitted

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[6] As the dissent observes, Ford was aware of the existence of pretensioners as early as 1992 and possessed some statistical data as early as late 1993 indicating "[Pyrotechnic] Pretensioners have the potential to provide safety benefits during frontal impact by improving the effectiveness of the seat belt" and "The pyrotechnic buckle-end pretensioner has potential for providing enhanced frontal crash protection in air bag equipped vehicles. Testing of the front outboard occupant positions has shown reductions in measured chest g's, chest deflections, femur loads, and occupant forward movement in some applications." (Plaintiff's Exhibit 18.) (emphasis added).

Plaintiff's Exhibit 17, Ford memoranda from 1992 entitled "Pretensioner Discussion" observed that European vehicles used pretensioners beginning about 20 years earlier, with pyrotechnical pretensioners available for 9 years. The conditions present in the European market as compared to the United States market included European "seat belt usage exceeding 90%," smaller air bags having slower deployment, and short front crush space in European vehicles. (Appellee's Addendum pg. 38.) The memoranda noted that "a stiffer belt system may have safety tradeoffs" and noted "limited evaluation" on American vehicles to "identify any potential safety benefit associated with the use of pretensioners." (Appellee's Addendum pgs. 38-39.)

The memoranda do not purport to suggest that pretensioners were tested in rollovers and provided superior protection.

into evidence Plaintiff's Exhibit 199, correspondence and attachments from TRW's Technology Planning and Quality Vice President to two Ford departments, with dates of April 3 and 4, 1996. TRW recognized the existence of a higher rollover rate for light trucks and lesser usage of seat belts in trucks, and made the following specific recommendations "for the Ford truck team:"

> Option A
> - Emphasize TRW's expertise in vehicle crashworthiness and our extensive knowledge and background with Ford's truck designs.
> - Recommend that they work to preclude doors opening during a crash by strengthening door locks and the B-pillar/door connection.
> - Recommend seat integrated belts with pretensioners activated by a rollover sensor (which may have to be purchased outside TRW).
>
> Option B
> - Same as Option A, plus:
> - Recommend a long duration head bag that protects the head and helps to keep the occupant in the vehicle during a rollover. This will be a relatively high cost product that may only have an acceptable cost/benefit ratio for the highest end of the light truck segment.

(Appellee's Addendum pg. 36.) (emphasis added).[7]

TRW, utilizing a "conventional retractor,"[8] had tested the "configuration" of integrated seats and pretensioners and its findings are briefly summarized in Exhibit 199 as follows:

> Since light trucks have markedly higher rollovers, this vehicle segment should lead the market initiative toward:
> - Pretensioners

[7] TRW's memoranda also briefly addressed development of "rollover airbags" and indicated "Potential benefit for these products are not yet defined, but a reference point for front and side air bags might be helpful." (Appellee's Appendix pg. 33.)

[8] The particular features of the seatbelt assembly(s) tested are not described beyond the reference to a "conventional retractor." (Plaintiff's Exhibit 199).

- Integrated seat belts into the seat

In both cases these configurations enhance restraint during all violent crashes and particularly in rollover. Injury will be significantly less during rollover with the elimination of slack and the improved geometry. Ejection will also be less likely if all slack is automatically removed (pretensioned) and the geometry is maximized by having the belt capture the top part of the shoulder (integrated belts).

(Appellee's Addendum pg. 19). (emphasis added). Exhibit 199 further provided "Less pre-crash belt slack and higher belt angles produce significant reductions in occupant vertical excursions. (Appellee's Addendum pg. 14).

As such, Exhibit 199 does not report testing or results of the performance of pretensioners in isolation, but rather in conjunction with seatbelts integrated into the seats. The use of pretensioners and "improved geometry" enhanced restraint.[9] It is also made clear in the memoranda that a sensor was necessary (appropriate for a particular vehicle).[10] Even assuming that Ford could reasonably have implemented TRW's April 1996 combination pretensioner/geometry/sensor suggestion before the November 1996 ship date of Moore's Ford Explorer, the features of the seatbelt assembly envisioned by TRW are not the same as those of the seatbelt assembly advanced by the Estate through Meyer's testimony.

The Estate claimed that Ford was negligent because it did not select and utilize

[9] Geometry, i.e., placing the belt such that a small amount of slack at the shoulder is present, is significant in that pretensioners are designed to act only upon a small amount of slack. The small amount of slack is pretensioned before the airbag sensor fires and the airbag deploys. Pretensioners available in the mid-1990s could exert "about fifty pounds of force." (Tr. 2303.) They could take out three inches of slack. (Tr. 2600.)

[10] At a minimum, some type of sensor is required for the pretensioners contemplated by TRW in Plaintiff's Exhibit 199. Ideally, a "rollover" sensor would be developed at some point. According to Exhibit 199, as of April 1996, three companies "had been working on" rollover sensors for 1½ years. (Appellee's Addendum pg. 36.)

cinching latch plates and pretensioners. However, Meyer did not have the benefit of any statistical study comparing the nature and number of injuries associated with the seatbelt assembly used in Moore's vehicle to the "alternative" seatbelt assembly proposed by Meyer with the two devices he suggested.[11] Whether a seatbelt assembly featuring a pretensioner and cinching latch plate as suggested by Meyer would have enhanced restraint in the aggregate better than Moore's seatbelt assembly featuring a pass-through plate, a ball and cup retractor, a web sensor, and a web grabber is a question left unanswered. This is a situation akin to that of Pries, where the expert advanced a design but "no car in production … used the combination of devices he favored." 31 F.3d at 546.

If Meyer's recommendations were actually implemented together or as a practical matter could have been implemented before the 1997 Explorer was marketed, resulting in "a feasible, safer, more practicable product design [that] would have afforded better protection," Miller, 551 N.E.2d at 1143, the jury was not so informed. In short, there were several "ideas," albeit ideas not yet subjected in combination to empirical testing.

Moreover, while the dissent suggests that there was evidence about the affordability of the Estate's alternative idea, the evidence at best pertained to the cost of an isolated component, i.e., pretensioners, and there is no definitive testimony or other evidence establishing the economic or engineering feasibility of incorporating the idea into the existing seatbelt assembly. To the contrary, Exhibit 199 supported the reasonable inference that Ford

[11] He acknowledged that "the vast majority of driver's seatbelts in cars, trucks, SUVs produced in the United States back at the time, back in 1996, used a pass-through tongue." (Tr. 1515.)

"may have to" purchase a rollover sensor for a pretensioner from a manufacturer other than TRW. It also supported an inference that manufacturers had only recently been "working on" a rollover sensor.

Indiana Code Section 34-20-2-2 requires the Estate to establish that Ford and TRW "failed to exercise reasonable care under the circumstances in designing the product[.]" As in Whitted, we cannot permit "a plaintiff to establish the existence of a design defect by his mere assertion." 58 F.3d at 1206. In plain words, an assertion is only a hypothesis until there is evidence to support its truth.

Sunroof

Again mindful that the Estate had to present a design that would have prevented Moore's death and would have cost-effectively improved aggregate safety, we turn to the evidence regarding the sunroof. Moore was ejected through the sunroof. The accident re-constructionist testified that the sunroof had dislodged during the first roll when roof distortion occurred. Based upon the position of the body relative to the vehicle, it was believed that Moore was ejected during a latter roll. Moore's body was found with the sunroof's gasket/seal around it. Dr. Joseph Burton, a medical examiner, testified that Moore "should have survived" if he had stayed inside the vehicle. (Tr. 715.) He referred to published articles indicating that a rollover victim who stays inside the vehicle is not likely to die.[12] He conceded that a fatality can occur although an occupant is properly belted.

[12] Dr. Burton clarified that his opinion did not account for the "drop height" of ten feet that Moore's vehicle experienced. (Tr. 784.) He testified that he had utilized the report of Dr. Enz, the accident re-constructionist, but that "roll rates and drop heights" were not part of the report. Dr. Burton further testified that "for whatever

The Estate presented the testimony of Dr. Steve Batzer, a consulting engineer, who opined that the sunroof was defective and the "frame failed at a low level" with head-form testing. (Tr. 924.) Dr. Batzer believed that it would cost $1 to $2 per vehicle to "beef up the individual components, such that when you push on them, they are not going to fail." (Tr. 948.) He concluded that the brackets were not strong enough because it "failed and bent" without the glass breaking. (Tr. 956.) In part, Dr. Batzer opined "you could come up with a hundred different ways to reinforce the periphery of this window, such that it won't come out when loaded by an occupant." (Tr. 948.)

Importantly, although Dr. Batzer testified about fortifying a sunroof structure to withstand an occupant load, Dr. Batzer did not actually build an alternative structure and test it. Moreover, the evidence here did not suggest that the sunroof dislodged due to a head strike (the circumstance utilized by Dr. Batzer in his testing of the Moore sunroof). Rather, the evidence was that Moore's sunroof dislodged in the first roll when the roof distorted after a large vertical drop, according to the uncontroverted testimony of the accident re-constructionist. Thus, the product failure was not due to loading of the occupant. He was ejected through the open portal. Accordingly, the Estate did not show that a sunroof design featuring more bolts would have prevented Moore's death. Considering the aggregate cost-effective safety of passengers, it is logically appealing that the use of more (inexpensive) bolts would add strength; again, however, actual statistical data of safer performance in a

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the reason" he did not have the deposition of Dr. Enz available to him in forming his initial opinion. (Tr. 784.) After learning of the drop height, Dr. Burton reiterated his belief that Moore would have survived if he had "remained in his seatbelt within the vehicle[.]" (Tr. 832.)

range of accidents was omitted. We do not know if more roof perforations to install bolts would unduly stress adjacent components of the sunroof structure or diminish overall performance. "To demonstrate a defect, the plaintiff must compare the costs and benefits of alternative designs." Pries, 31 F.3d at 545 (citing Miller, 551 N.E.2d at 1141-42 and Products Liability § 2(b) and comment c). Here, there was no comparison between the sunroof as designed and a sunroof with extra bolts.

The Estate also submitted into evidence the deposition of N. Ramanujam, a retired Ford employee. He had modified a "glass run channel" and obtained a patent with the objective of increasing retention of window glazing material during an impact. In part, he took sheet metal, drilled holes, and clamped it to the driver's side door of a Taurus. "He determined that "a glass run channel with robust flange can successfully retain the head-form inside the vehicle when impacted up to about 30 miles per hour." (Tr. 1024-24.) He also stated "there is still a long ways between what I did and what can be done in production." (Tr. 1020-21.) The benefit of the deposition may have been somewhat diminished in light of the instruction to the jury to disregard any allegation of defect with regard to the selection of window material. Nevertheless, there was no indication that Ramanujam tested sunroofs in addition to side windows or re-created any circumstances like those present in the Moore accident. He did not proffer an actual alternative sunroof design. Again, there was no comparison between performance of the Moore sunroof and an alternative sunroof.

Conclusion

In light of the foregoing, the Estate failed to present sufficient evidence that Ford or

TRW breached a duty of reasonable care. Accordingly, the negligence claim must fail and the jury verdict is reversed.

Reversed.

BRADFORD, J., concurs.

RILEY, J., dissents with separate opinion.

IN THE
COURT OF APPEALS OF INDIANA

FORD MOTOR COMPANY and TRW VEHICLE SAFETY SYSTEMS, INC., Appellants-Defendants, vs. SALLY MOORE, Personal Representative of the Estate of Daniel A. Moore, Appellee-Plaintiff.	)	No. 73A05-0710-CV-552

Riley, Judge, dissenting with separate opinion.

I respectfully dissent from the majority's decision to reverse the jury's verdict on the Estate's product negligence claim against Ford and TRW. The majority opines that the Estate failed to present sufficient evidence that Ford or TRW breached their duty of reasonable care. We note that upon review of a jury verdict, we will neither reweigh the evidence nor judge the credibility of witnesses, but will examine the evidence most favorable to the appellee and all reasonable inferences drawn therefrom. *Beall v. Mooring Tax Asset Group*, 813 N.E.2d 778, 781 (Ind. Ct. App. 2004).

As recognized by the majority, Indiana's Product Liability Act imposes liability upon sellers of a product in a defective condition unreasonably dangerous to any user or consumer. *Ford Motor Co. v. Rushford*, 868 N.E.2d 806, 809 (Ind. 2007). The Act governs actions brought by a user or consumer against a manufacturer or seller for physical harm caused by a product, regardless of the substantive legal theory or theories upon which the action is brought. *Id*. Proceeding under a negligence theory, the Estate was required to prove that: (1) Ford and TRW owed a duty to Moore; (2) Ford and TRW breached that duty; and (3) Moore's injury was proximately caused by the breach. *See id*. at 810. Ford and TRW concede they had a duty of care towards Moore, but contest the breach of duty and resulting injury. In its analysis, the majority focuses on the doctrine of crashworthiness and acknowledges that "defectiveness" under the doctrine involves a product that failed to provide the consumer with reasonable protection under the circumstances surrounding a particular accident. *See* slip op. p. 6 (quoting *Miller v. Todd*, 551 N.E.2d 1139, 1143).

Looking at the evidence most favorable to the Estate, the Estate's expert, mechanical engineer Steven Meyer (Meyer), testified that Moore's 1997 Ford Explorer had a defective seatbelt restraint system which allowed "the belt to become unlocked during the rollover portion of a rollover." (Transcript p. 579). Because Moore's seatbelt became unlocked, it spooled out, causing Moore's ejection from the vehicle. Specifically, Meyer indicated that four conditions contributed to the intermittent release of the seatbelt's webbing: (1) sensor in the ball and cup retractor design was in neutral and the ball was at the bottom of the cup; (2) tension was relieved; (3) the belt rewound to allow the lock bar to fall out; and (4) tension

was reapplied to extract significant belt. These four conditions occurred and unlocked Moore's belt "during the roll, most probably when there were vertically directed accelerations similar to those wheels down, slam down." (Tr. p. 1396). Any of the three rollovers of Moore's car had "to a reasonable degree of scientific certainty" a "vertically based impact." (Tr. p. 1398). Overall, Meyer indicated that in the fifteen years that he has been studying rollover crashes, he had never seen a full ejection by a belted occupant without any belt failure.

Nevertheless, in order to have a successful negligence claim under the doctrine of crashworthiness, the Estate, as recognized by the majority, also has to demonstrate that a "feasible, safer, more practicable product design would have afforded better protection" to Moore. *See* slip op. p 7 (quoting *Miller*, 551 N.E.2d at 1143; *Pries v. Honda Motor Co., Ltd.*, 31 F.3d 543, 546 (7th Cir. 1994)). In order to reach its conclusion that the Estate failed this burden, the majority engages in a patent exercise of reweighing the evidence and Meyer's credibility.

The case law reflects that it is sufficient that the plaintiff proffers a demonstrably better design in order to show that the defendant was negligent in selecting and implementing an inferior design. *See, e.g., Bammerlin v. Navistar Int'l Trans. Corp*., 30 F.3d 898 901 (7th Cir. 1994); *Whitted v. Gen. Motors Corp*., 58 F. 3d 1200, 1206 (7th Cir. 1995). This proposed design must be supported by reliable data, such as testing, studies, or statistics to show the feasibility of the alternative design. *Rogers v. Ford Motor Co*., 952 F.Supp. 606, 615 (N.D. Ind. 1997). Therefore, a suggestion to improve upon the current design, supported by data

that indicate the improved design's superiority and feasibility would satisfy the current case law. Looking at the evidence in the light most favorably to the Estate, I believe this burden of proof was met.

Although the Estate's expert advanced two alternative designs—a cinching latch plate and pretensioners—his testimony focused mainly on the use of pretensioners as a supplement to improve upon the conventional seatbelt design. The purpose of a pretensioner is to eliminate any slack that might be present in the seatbelt's restraint system and enhance the overall performance of the system as a whole. To support Meyer's proposed alternative design, the Estate introduced Exhibit 199 which established that in 1996, prior to the building of Moore's 1997 Ford Explorer, TRW recommended Ford in writing to use pretensioners to address the risk that a "conventional retractor can have intermittent release of webbing during rollover." TRW's report included statistical data reflecting that light trucks are twice as likely to roll over as passenger cars and that less pre-crash belt slack and higher belt angles produce significant reductions in occupant vertical excursions. It concluded that a pretensioner would "enhance restraint during *all violent crashes* and particularly in rollover. Injury will be significantly less during rollover with the elimination of slack and the improved geometry." (Exh. 199) (emphasis added).

In addition, the Estate introduced two supplemental exhibits written by Ford in furtherance of the Estate's presentation on pretensioners: Exhibit 17, dated September 25, 1992, and Exhibit 18, dated November 19, 1993. Exhibit 17 indicates that "NAAO Car Product Development and NAAO Light Truck Product Development have designated

pretensioners as a technology/feature want on several NAAO vehicles beginning in 1996. Several foreign manufacturers are providing pretensioners for their US market for 1992. Consumer Reports presents pretensioners on these vehicles as an improved safety feature." In turn, Exhibit 18 includes empirical data from tests comparing seatbelt slack resulting from baseline, conventional belts versus slack resulting from conventional retractors enhanced with a pretensioner and shows that pretensioners outperform the conventional ball and cup retractor. The document calculates the projected total incremental cost of installing pretensioners to be thirty-five dollars per vehicle. As such, relying on all this available empirical evidence, Meyer concluded that prior to building Moore's vehicle in 1997, Ford had a "feasible, technologically feasible, economically feasible pretensioner design" in production. (Tr. p. 596).

In sum, based upon the standard of review and the evidence before me, I find that the Estate presented sufficient evidence from which the jury could reasonably conclude that a safer and feasible alternative to the conventional seatbelt was available that would have cost-effectively improved aggregate safety in all types of crashes.